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FBI Laboratory

2501 Investigation Parkway
Quantico, Virginia 22135

LABORATORY REPORT

To: Legat Singapore

Date: October 27, 2015

Case ID No.: 163V-SG-6724400

Lab No.: 2015-02440-5

Communication(s): Dated October 28, 2015

Agency Reference(s):

Subject(s):

Title: Explosion Investigation at Maldives:
Foreign Police Cooperation-
Technical Assistance Request

Discipline(s): Explosives Device

FBI Laboratory Evidence Designator(s):

THE FOLLOWING ITEMS WERE RECOVERED FROM THE MALDIVIAN GOVERMENTAL VESSEL, TIIE FINIFEMA. AN EXPLOSION OCCURRED ON SEPTEMBER 28, 2015 ON THIS VESSEL IN THE HARBOR OF MALE, THE MALDIVES. THESE ITEMS WERE SUBMITTED UNDER COVER OF COMMUNICATION DATED OCTOBER 28, 2015, RECEIVED INTO THE LABORATORY ON OCTOBER 22, 2015 AND OCTOBER 27, 2015 AND ASSIGNED LABORATORY NUMBER 2015-02440.

Item 1	Control swab
Item 2	Control swab of evidence recovery personnel
Item 3	Swab of compressor housing plate (1 of 2)
Item 4	Swab of back of cabinet
Item 5	Swab of compressor housing plate (2 of 2)
Item 6	Swab of compressor dented area
Item 7	Swab of radiator housing
Item 8	Swab of right side panel of steering wheel house
Item 9	Swab of left ceiling above steering wheel house

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Item 10	Swab of center ceiling above steering wheel house
Item 11	Foam from fan blower
Item 12	Swabs labeled as "taken from plywood just beneath captain's seat" (Maldives Police Service Item MS12)
Item 13	Swabs labeled as "taken from the partition of the wheel house" (Maldives Police Service Item MS02)
Item 14	Swab labeled as "top ceiling near the wheel house" (Maldives Police Service, no item number)
Item 15	Swab labeled as "taken from used jump suit in scene" (Maldives Police Service, no item number)
Item 16	Plastic bottle (Maldives Police Service Item MS10)
Item 17	Plastic bottle (Maldives Police Service Item MS08)
Item 18	Pieces of tissue paper (Maldives Police Service Item MS11)
Item 19	Clothing labeled as "Safari trouser of bodyguard" (Maldives Police Service Item AS2)
Item 20	Clothing labeled as "Safari shirt of bodyguard" (Maldives Police Service Item AS3)
Item 21	Screws
Item 22	Wires
Item 23	Razor blade with cloth wrap
Item 24	Small metal piece
Item 25	Base Plate

This report contains the final results of the hazardous device examinations performed in the Explosives Unit.

Administrative:

This report will be separated into two sections. Section 1 will be the background on the explosion and the search conducted of the blast scene. Section 2 will cover the Results of Examination on the items submitted to the FBI Laboratory.

Conclusion:

Contained in the submitted items are specimens that were located at the blast scene. These items consisted of two plastic bottles, screws, clothing, wires, small piece of metal and a razor blade with cloth wrapped around it.

An Improvised Explosive Device (IED) is also known as destructive device or homemade bomb. The general components of an IED are a main explosive charge and a fuzing system. A container is optional in an IED and is used as a means of carrying and/or concealing the IED or enhancing its destructive effect.

The submitted specimens were determined to be components from the boat and not the components of an IED. Based on this examiner's forensic analysis of the scene, evidence recovered and the chemistry results, it is the opinion of this examiner that no conclusive evidence exists to attribute the explosion which occurred on the boat to an IED.

SECTION 1:

Background (Blast Scene):

On September 28, 2015 an explosion occurred on an official Maldivian government boat (Figure 1) carrying the President of the Maldives and his entourage. The United States was asked to assist in the investigation of the explosion. The FBI Explosives Unit along with other FBI personnel conducted a post blast investigation on the boat.

The boat consisted of three deck levels; the upper level deck, which is outside and from where the crew may operate the boat (the flying bridge area); the main deck level with an entertainment area plus an inside bridge area; and the lower deck level which has a galley, bathrooms and bedrooms.

The explosion occurred on the main deck level, inside the entertainment area of the cabin of the boat, injuring the First Lady and two other people. The explosion occurred as the boat was backing into a jetty in Male, Maldives.

Areas of the Boat (Blast scene):

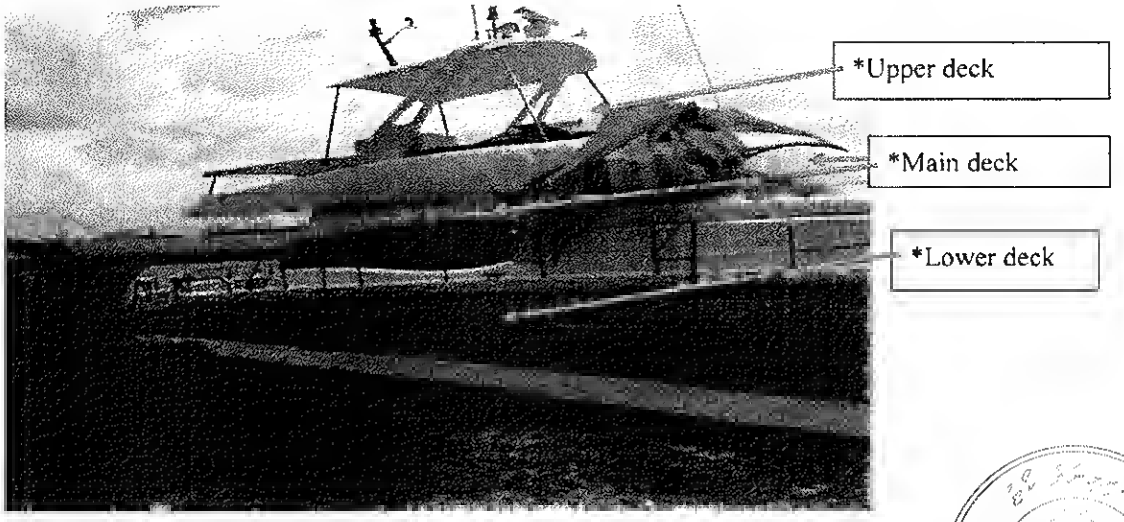

Figure 1

Upper Deck Level

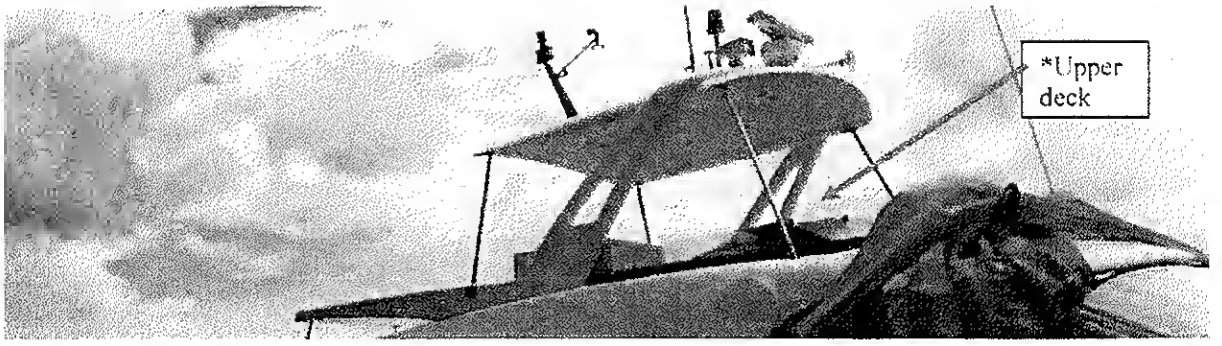

Figure 2

Figure 2 shows the upper deck level, outside bridge area which sustained no damage from the blast.

Main Deck Level

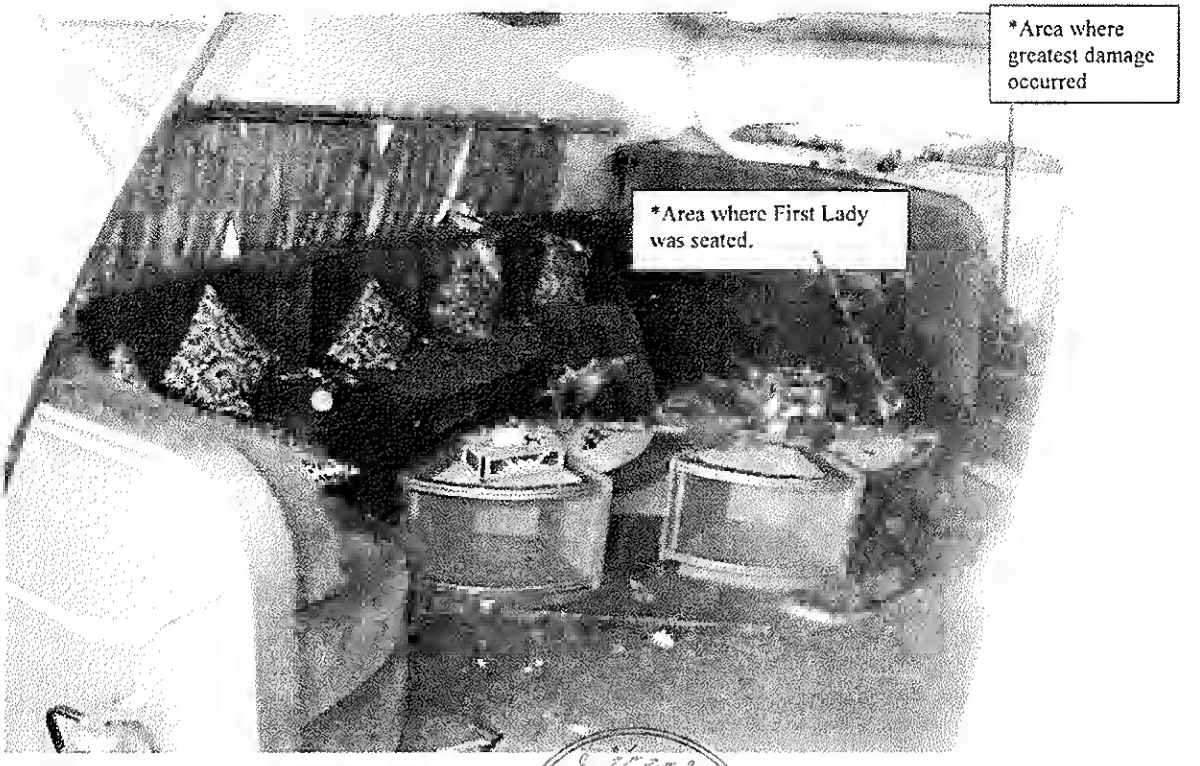

Figure 3

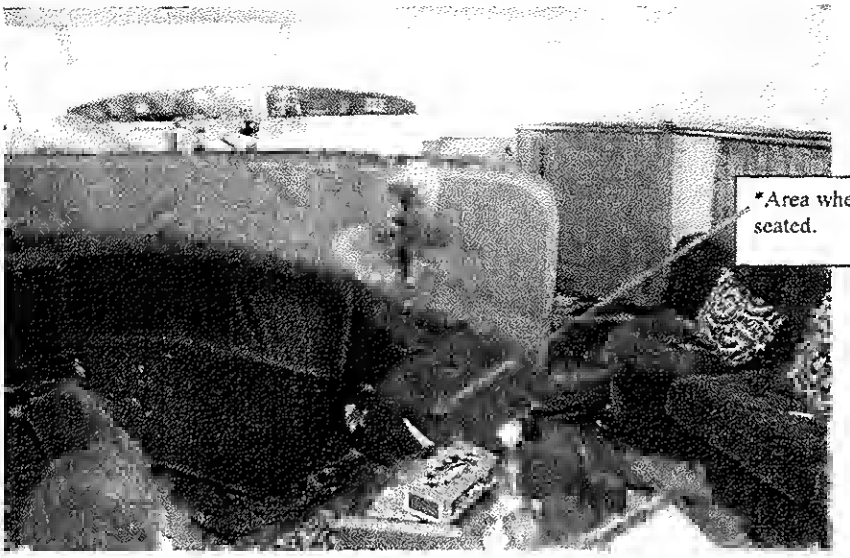

Figure 4

The main deck is the level where the explosion occurred, causing damage to the interior seating area and the box seat in the bridge area. The explosion damaged the half-wall between these two areas. No windows were shattered or broken during the blast. The rear sliding glass door was pushed off of its tracks and one window in the bridge area of the boat was slightly pushed out of its frame.

The First Lady was sitting on the couch as noted in figure 3 and figure 4, directly aft of the wall where the area of greatest damage occurred. She sustained several fractured vertebrae when the overpressure from the explosion threw her forward over the coffee table. Other injuries to personnel on the boat were reported as being minor.

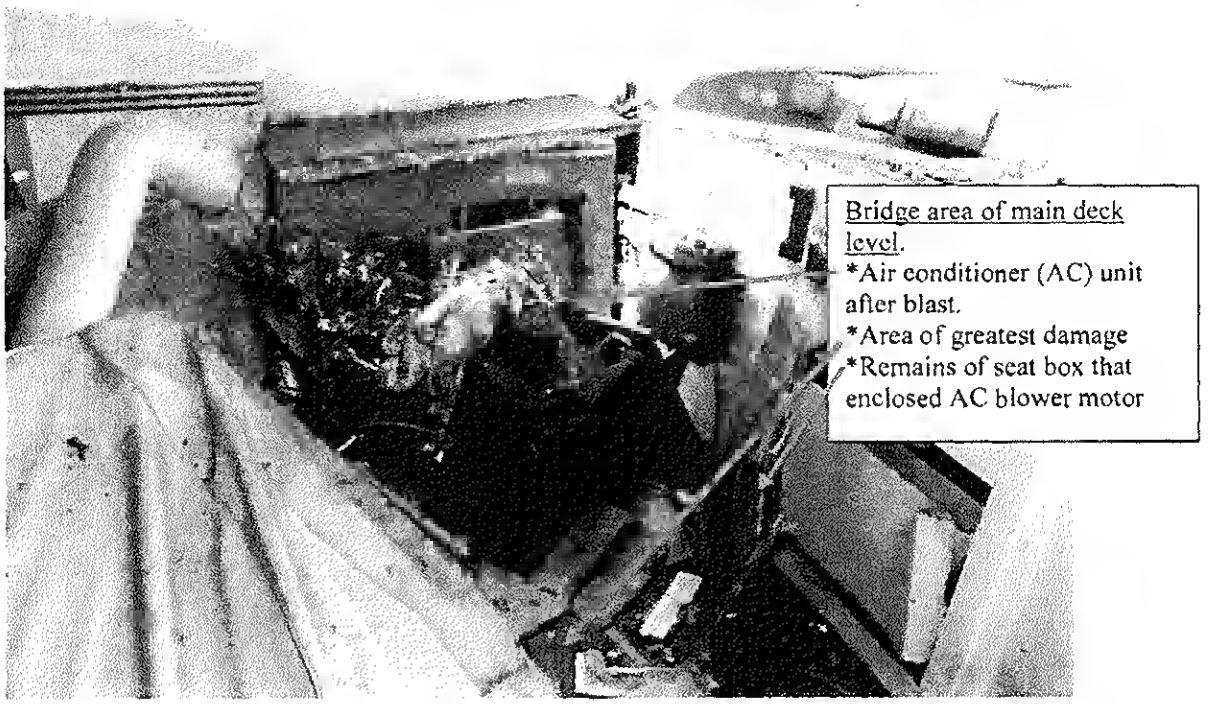

Figure 5

Figure 5 shows the area where the greatest damage occurred, located on the main deck level in the bridge area. The seat box that enclosed the air conditioner (AC) blower motor was destroyed by an explosion originating from within its interior. The AC unit was pushed up and sustained damage to its base plate frame and the fan motor housing. The flexible aluminum exhaust tube was destroyed.

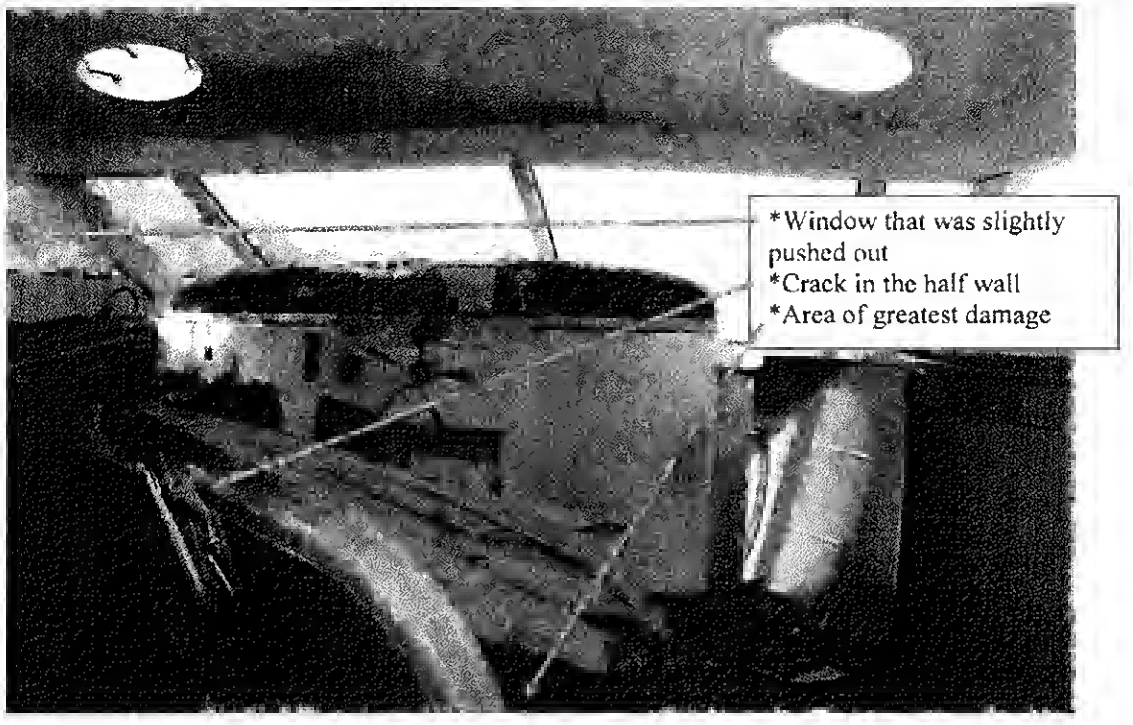

Figure 6

Figure 6 shows the cracked half-wall that is broken from its base along its entire length due to the explosion. The area of the crack in the wall is directly behind the area of greatest damage. The window shown above and in figure 13 below was slightly pushed out.

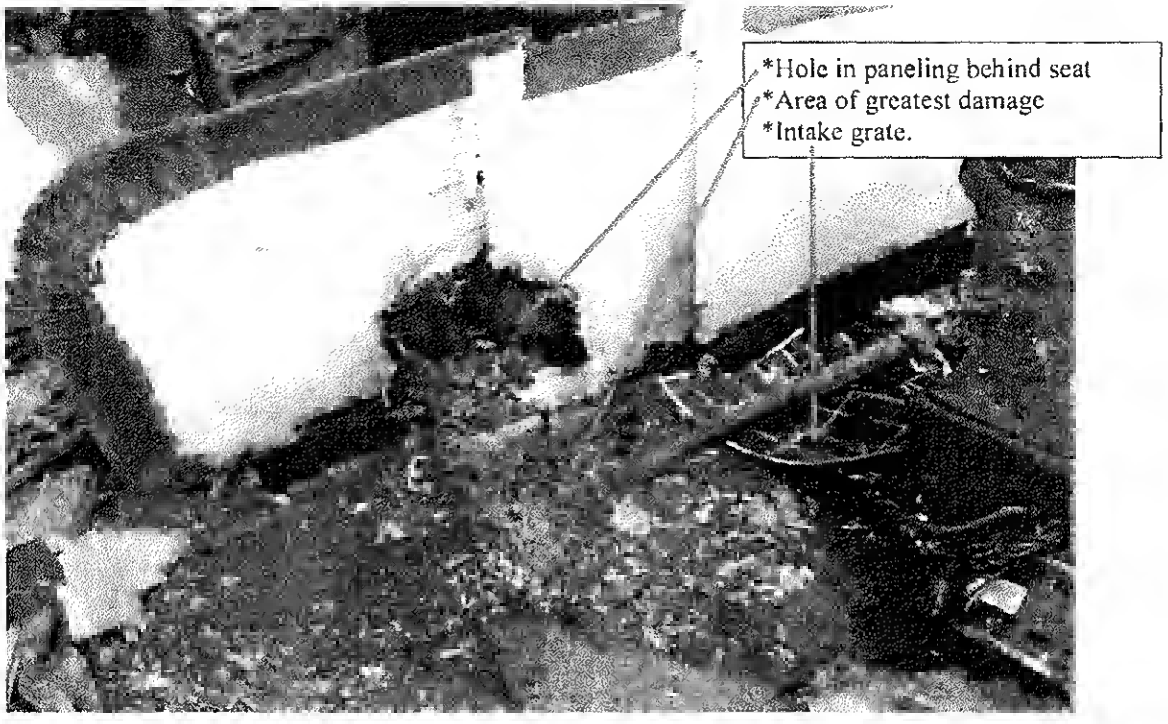

Figure 7

Shown in figure 7 is the area of greatest damage on the boat. As depicted in this photo, the wood paneling had been removed from the seat to expose the hole created by the overpressure. The intake grate, which was attached with screws to the box seat, allowed air to be taken in by the blower motor (see figure 13 for approximate location of the intake grate). This grate exhibited damage of being pushed outward from the seat by the overpressure from the explosion.

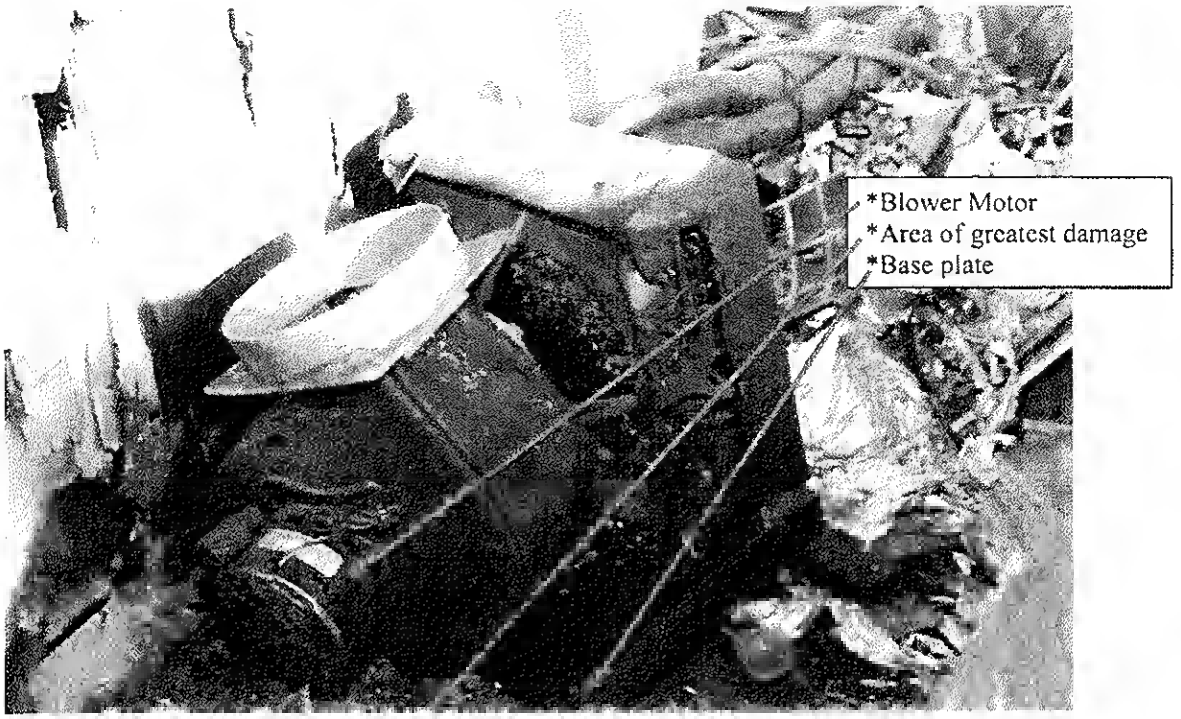

Figure 8

Figure 8 shows the blower motor and the base plate in the approximate location where they would have been before the explosion. Soot was visible on the blower motor and fan casing. (See figure 13 for further detail)

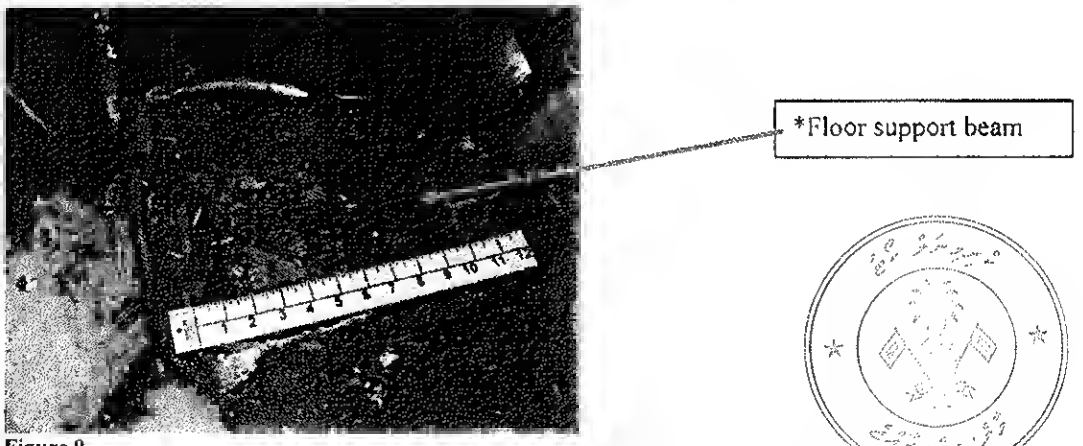

Figure 9

Figure 9 shows the area of greatest damage and the red arrow is pointing to the main support beam which has no visible damage.

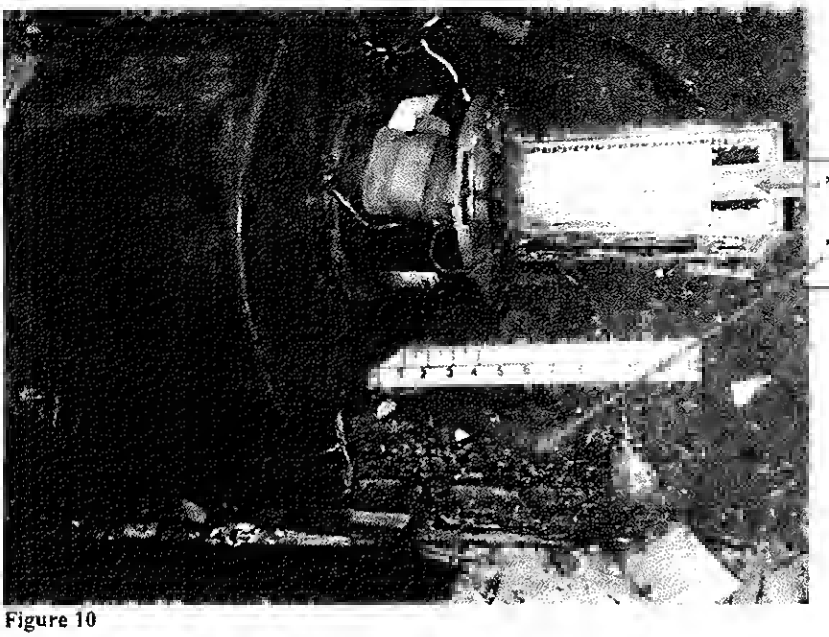

Figure 10

Figure 10 shows a facial tissue box utilized to support the blower motor for demonstration of its location. The area below the ruler shows that no damage occurred to the ceiling of the galley, even though this area is only approximately 2 inches below the area of greatest damage.

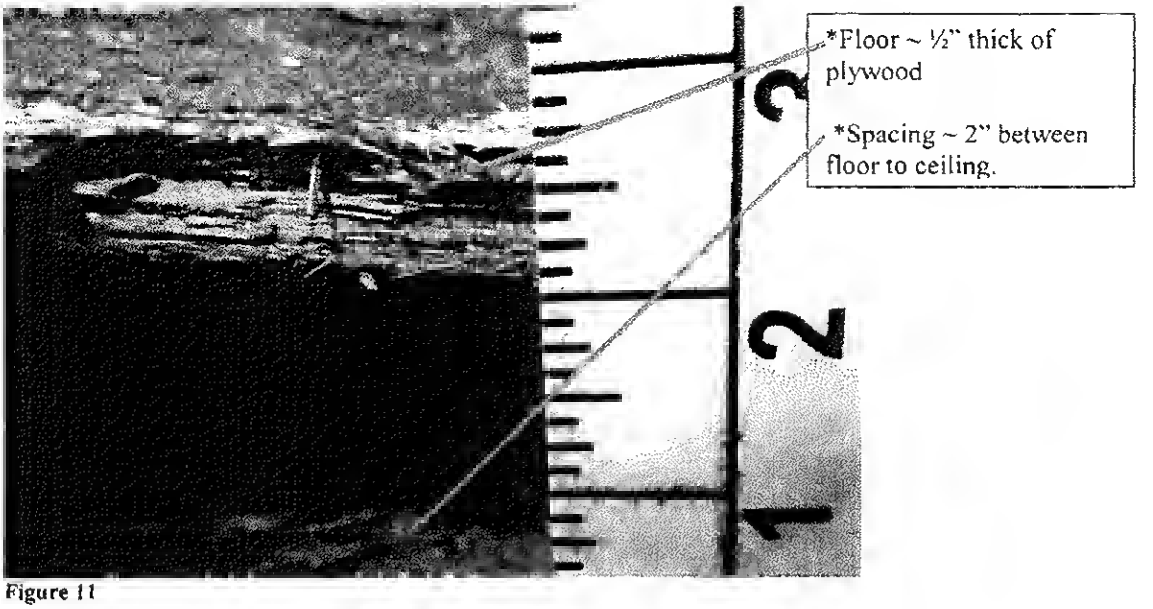

Figure 11

Figure 9 and figure 10 show the approximate size of the area of greatest damage. The approximate size of damage to the floor is 9" long x 10" wide. Figure 11 shows the thickness of the floor, which was ½" plywood, and the spacing between the floor and the ceiling of the galley below, which was approximately 2 inches. There was no penetration of the galley ceiling from overpressure nor from fragmentation of the subfloor above.

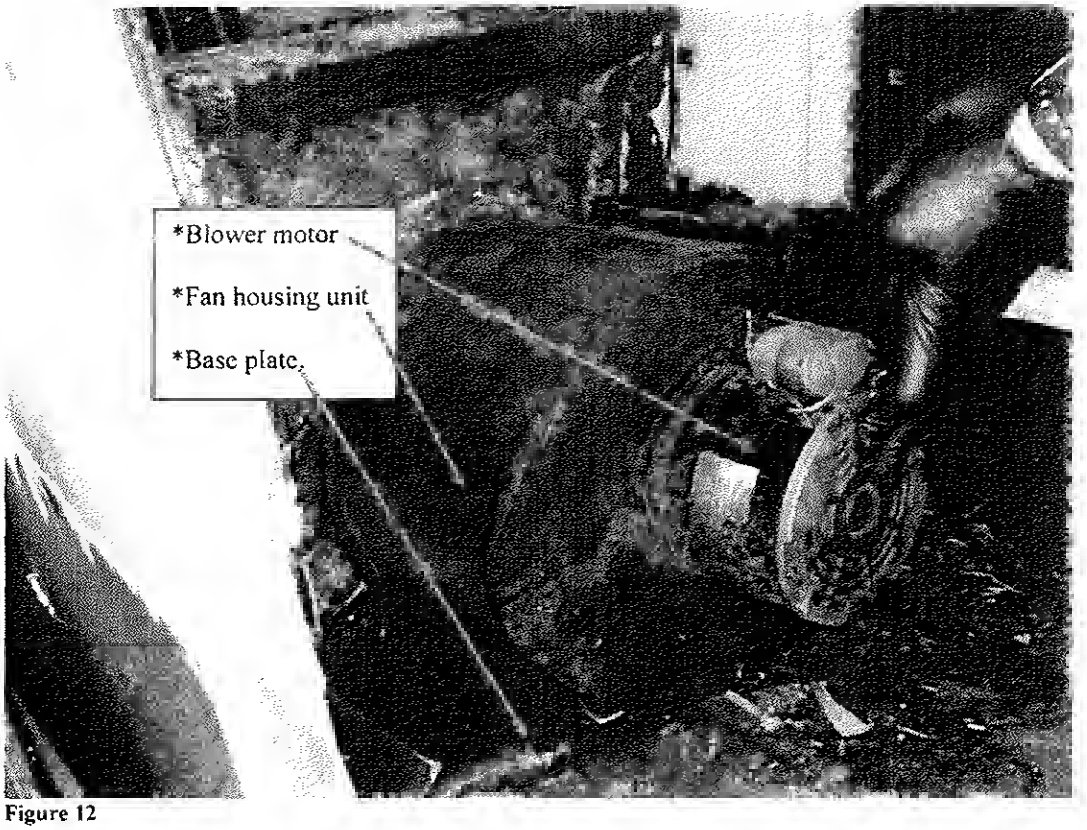

Figure 12

Figure 12 shows damage to the base plate and fan housing unit.

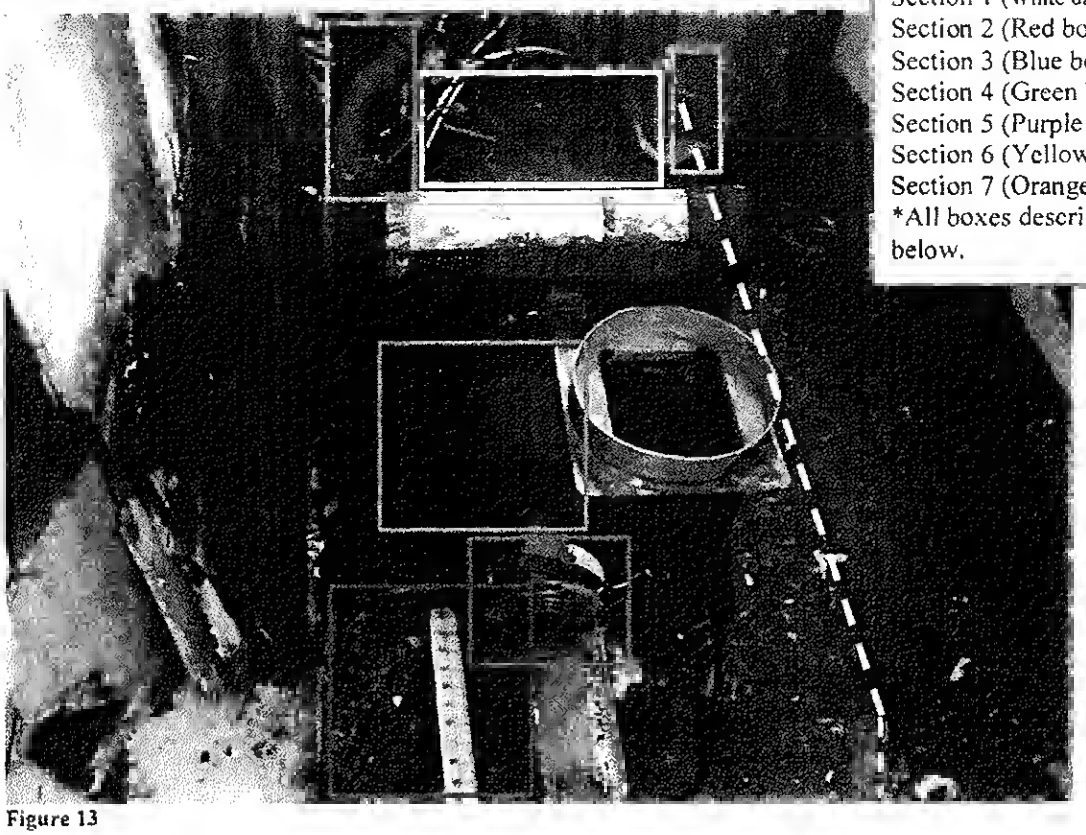

Figure 13

Figure 13 shows an overview of how the air conditioner unit was located under the box seat area. The white line (section 1) is an approximate outline of the outer wall of the box seat that covered the air conditioning unit. The red box (section 2) indicates the black insulation covering two copper coolant lines that carried refrigerant from a storage tank to the air conditioning unit and back. The blue box (section 3) indicates the fan housing unit that sustained damage (see figure 12 for closer view of damage) from the blast. The green box (section 4) indicates the fan motor. The purple box (section 5) indicates the area of greatest damage. The yellow box (section 6) is where cleaning chemicals purportedly were stored along with other chemicals used on the boat for various maintenance purposes. To gain access to this area, screws would have to be removed from the lid of the box seat or the air intake grate. The approximate location of the air intake grate is indicated by the orange box (section 7).

The lower deck directly below the area of greatest damage on the main deck sustained minimal damage; a broken mirror in the bathroom, (figure 14) and broken wood in the galley (figure 15).

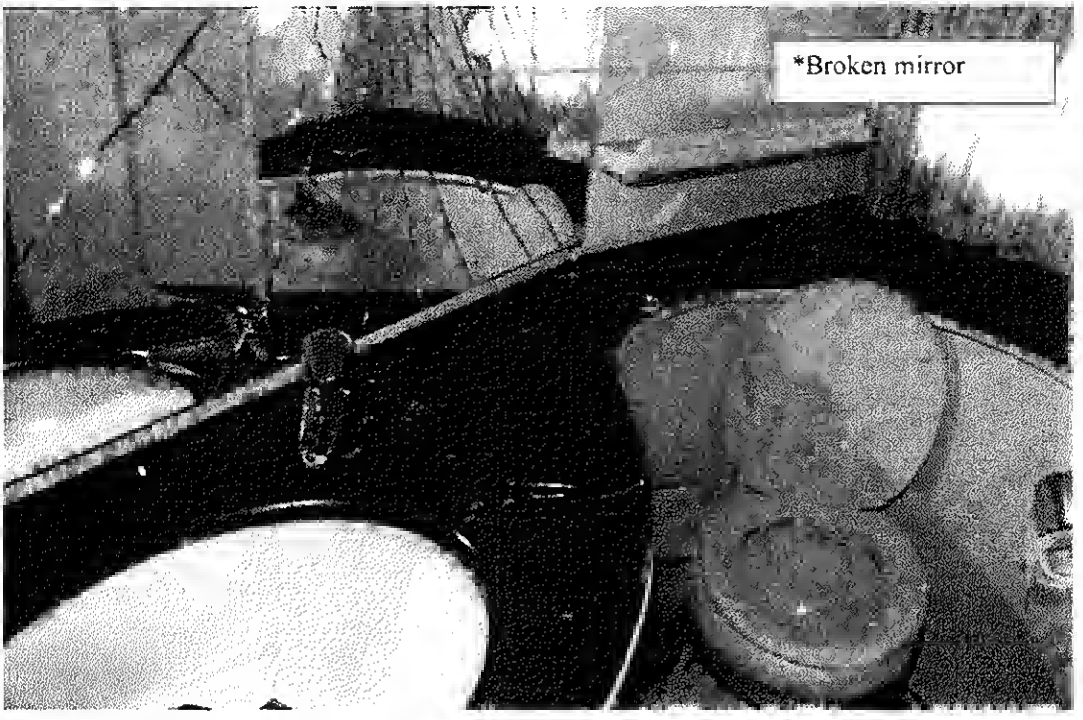

Figure 14

Figure 14 shows the broken mirror in bathroom on the lower deck. This bathroom was located directly at the bottom of the stairs below the area of greatest damage.

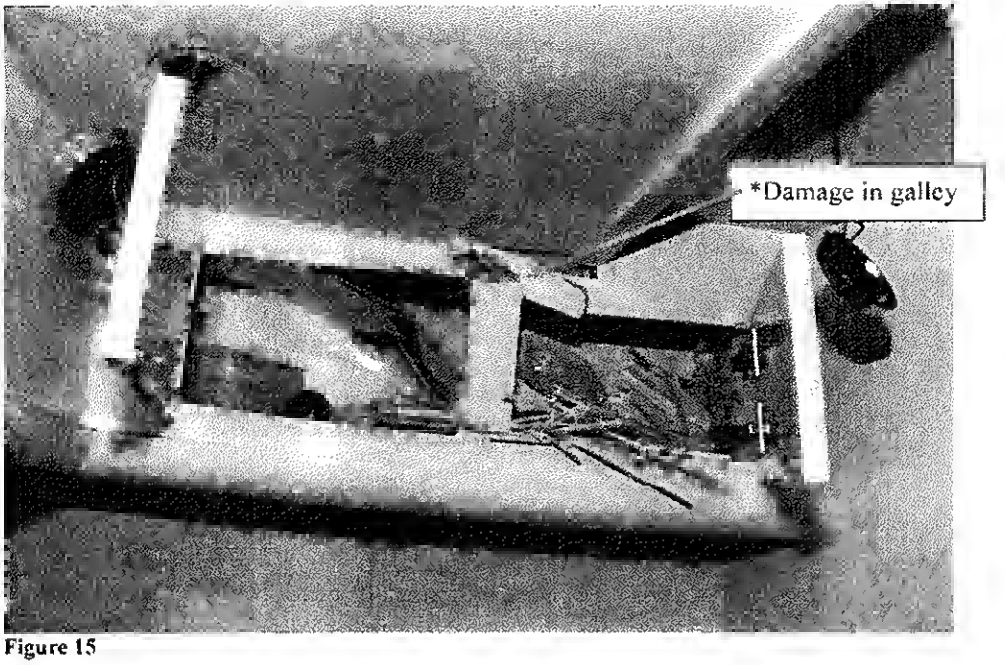

Figure 15

Figure 15 shows the damage to the wood cabinet in the galley. There was no penetration of the ceiling from the area of greatest damage above.

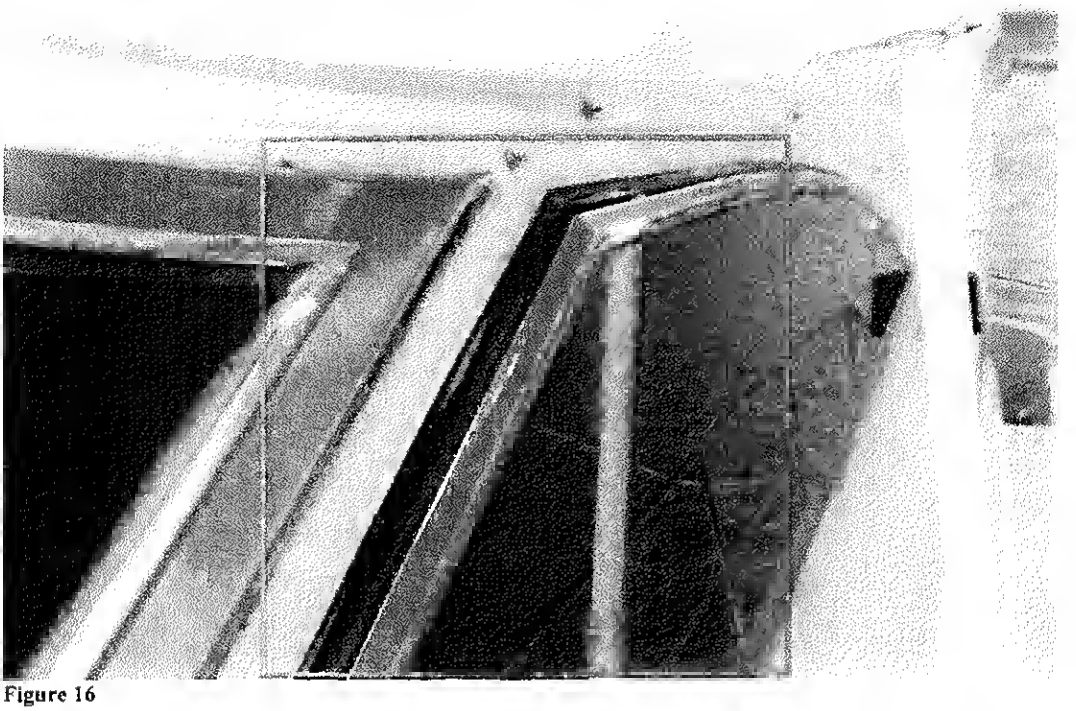

Figure 16

The exterior of the boat had no visible damage except a port side window (shown in the red box in figure 16) that was slightly pushed out from its frame due to the blast.

Based on this examiner's forensic analysis of the scene, evidence recovered, and the chemistry results, it is the opinion of this examiner that no conclusive evidence exists to attribute the explosion which occurred on the boat to an IED.

Explosions may be caused by other chemical and mechanical events. Chemicals that are flammable. or release flammable gasses, and are stored near mechanical equipment may cause an explosion commonly referred to as a Fuel Air Explosion (FAE). The main destructive force of a FAE is overpressure to items and personnel in the immediate area of the explosion.

An accidental FAE occurs when flammable vapors mix with the correct ratio of atmospheric oxygen. If this mixture comes in contact with a spark or even an overheated piece of machinery it may cause an explosion. For a FAE to occur there is a minimum ratio of fuel vapor to atmospheric oxygen below which ignition will not occur. Alternately, there is also a maximum ratio of fuel vapor to atmosphere oxygen, above which ignition will not occur. These limits are termed the lower and upper explosive limits.

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These types of explosions commonly occur in a wide variety aspects of civilian, industrial and governmental operations. These type of FAEs may cause property damage, personal injury and/or death.

SECTION 2:

Results of Examinations:

Chemistry Examinations:

Items 1 through Item 20, consisting of swabs, plastic bottles, clothing, facial tissue and foam were sent to Explosives Unit Chemistry for testing. Items 1 through Item 10, Item 12 through Item 17, and Item 19 through Item 20 were negative for explosive residues. Item 11 (foam) was not tested due to matrix limitations. Residues of isopropyl alcohol were identified on Item 18 (piece of tissue). Isopropyl alcohol is a flammable liquid. For information on the chemical analysis conducted on the above listed items, see the report of [redacted] II, Explosives Unit, dated 2015-02440-4, October 25, 2015. (RPM)

Miscellaneous Device Examinations:

Items 21 through Item 25 were examined and determined to be components from the boat and are not the components of an IED.

Item 21 consisted of two screws. One of the screws exhibits bending likely resulting from its attachment to structural components of the boat damaged by the overpressure. Both of these screws were identified as being from the boat.

Item 22 consisted of six lengths of wire ranging from approximately 3 ¼ inches in length to 6 3/8 inches. All of the wires were identified as being 26 American Wire Gauge (AWG) and were identified as being from the boat. None of the wires had damage consistent with being in close proximity to an explosion.

Item 23 consisted of one homemade handle with a razor blade attached to it. Local investigators indicated that these homemade razor blade holders are common in the Maldives.

Item 24 consisted of a small metal piece similar to the AC duct work. Item 24 had damage consistent with being in close proximity to an explosion.

Item 25 consisted of a metal base plate or tray that had the blower motor, fan unit and radiator sitting on it. This plate had damage consistent with being in close proximity to an explosion.

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Methods:

The methods utilized during the analysis of the specimens included examination of photographs, visual inspection, physical measurements, comparisons of observable physical characteristics and review of references.

Interpretations and Limitations:

The overpressure and/or fire resulting from an explosion can cause extensive damage including fragmentation, charring or other severe alterations to items in close proximately to the event. Due to the destructive nature or these types of energetic events, conclusive determinations as to the recognition and identification of specific items may not always be effected in every case.

Remarks:

For questions about the content of this report, please contact Supervisory Special Agent [redacted]

For questions about the status of your submission, including any remaining forensic examinations, please contact Request Coordinator [redacted] at 7[redacted]

All examinations are complete and the submitted evidence will be returned to the contributor under separate cover.

The supporting records for the opinions and interpretations expressed in this report are retained in the FBI files. This report contains the opinions and interpretations of the examiner(s) who issued the report.

[redacted]